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CORRESPONDENCE.

EDITOR OF 'THE AUK'.

Dear Sir:—

I note that in the October number of 'The Auk,' Mr. Robert Thomas Moore presents some criticisms of what I have chosen to call the graphic method of recording bird songs. Since Mr. Moore credits me with a statement that I did not make, and since many of the faults he finds are the result of misunderstanding, or exist principally in his own imagination, I should like to take a little space to answer him.

In the beginning we must realize that it is our intention to study bird songs, not from the standpoint of a musician but from that of a scientist. We care little for the fact that musicians do not consider pronunciation a factor worth dealing with. If it has no application to bird music, it makes little difference what the musician's definition of a trill is. If musicians consider that the duration of a song in seconds is of secondary importance to them, that is no reason why it is of secondary importance to the scientist. The bird-lover may care little about the amount of white on the junco's tail. All he wants to know is that it is a junco, after which he spends his time admiring the dainty contrast of its colors. But to the student of bird plumages the amount of white is important, and there may be cases where such a character becomes of extremely great importance. The same thing applies to bird song. The length of a song is one of its characters, a character that may be specific, that may have just as great, or even greater im-

portance than that the bird sings in triple time. When the bird does not sing in any particular time, the duration of the song in seconds is practically the only time character that we can record with accuracy.

Mr. Moore founds a large amount of his criticism on his evident belief that I denied the existence of rhythm in bird songs in general. When one assumes the rôle of critic it becomes his duty to read carefully that which he is going to criticise. Otherwise he is liable to waste space and time criticising errors that originated in his own faulty reading or interpretation. I was particularly careful not to deny the existence of rhythm in bird songs, for I was entirely aware that some of my records were rhythmic. What I did wish to make clear was that a great many bird songs are not rhythmic, and that for that reason a method of recording time which depends on a mathematical relation between the durations of single notes is not suited to bird songs.

Mr. Moore makes some curious distinctions between the meanings of the words time and duration, and concludes from this that I have ignored time and rhythm. Does Mr. Moore think that I measure the duration of the song as a whole, only? Does he believe that the lengths of the separate notes on the record are meaningless? This is evidently what he does think, for how else could he conclude that the graphic method does not record rhythm? How else could he get the notion that the rhythm in some of the records is obscured by the method? What difference would it make had I used the word time instead of duration? None whatever, for duration and time are one and the same factor. Mr. Moore would have us think that duration does not include rhythm. Yet he himself says that a knowledge of "the relative duration of the individual notes of a song . . . would result in some knowledge of the song's rhythm." That is true. And in some cases it would result in a knowledge of the song's lack of rhythm. Mr. Moore implies that I am unable to record rhythm by the graphic method, yet he proves the contrary himself. He tells us that he has found rhythm in some of the records, particularly that of the robin. Yes, the rhythm is there, showing plainly at a glance. Mr. Moore, with his musician's mind, must needs reduce it to measures and triple time in order to see it, but those who are not so well versed in music can see it too, by the horizontal lengths of the phrases and pauses. Rhythm, when it exists, can be recorded by the graphic method just as accurately as by any other. Even when it is retarded or accelerated the stop-watch checks it up, in spite of Mr. Moore's statement to the contrary, and not only checks it, but shows just how much retardation and acceleration there is.

But it is when the song does not happen to be rhythmic that the graphic method shows its greatest utility. The old method must make the song rhythmic in order to record it. Every note of the song must have a mathematical relation in length to every other note. Now a bird may sing notes, the relative durations of which are totally incommensurable. Shall we change such a song in order to make it fit our method? Is such a proceeding scientific accuracy? Or is it the conception of a musician, so

trained in the rules and necessities of human music that he is unable to conceive of music that is not rhythmic? Is it not far preferable to change the method to fit the song?

In the matter of pitch Mr. Moore decides that the graphic method, since it requires twelve horizontal lines, is much too complicated. He uses much space telling how numerous the lines would have to be in order to record the pitch of a note with absolute accuracy. Undoubtedly there would have to be not merely a few thousand lines but an infinite number. Our accuracy in recording pitch is limited by the accuracy of the human ear in perceiving it. It is unnecessary to record the note more accurately than we can hear it.

If the horizontal lines were all that counted, five lines would be far simpler than twelve. But we must bear in mind a few of the other intricate necessities of the old system. We must begin our staff with a clef. We must decide on some key in which the bird is supposed to sing, and indicate this by anything from five sharps to five flats, carefully placed on their proper lines or spaces. We must use more of these sharps and flats, and also a few natural signs, whenever the bird happens to forget to which key the recorder has assigned his song. If the bird forgets frequently, we have the alternative of changing the key, which is slightly less intricate. We must add lines above or below the staff every time the bird strays out of the limits of the original five. We must add some more marks at the top to indicate how many octaves above middle C the bird sings. Combined with all this we must keep constantly in mind the fact that at certain places on the staff the interval between a line and a space is half a tone, while in others it is a whole tone. Five lines may be very simple, but considering all that goes with it I much prefer twelve, or even thirty-six. Yet Mr. Moore tells us that this method is more simple and comprehensive than the graphic!

To go back to the matter of time, we find here also a complicated system. A number precedes the song which tells the number of beats to the measure. Another number at the top tells the number of beats to the minute. Each separate note must be one of a dozen or so sorts, indicative of its duration in beats. At the top we must write retards and accelerations, which do not show with accuracy how much of the song is retarded or accelerated, nor how great is this change in time. The whole method, taking pitch and time together, is so intricate that, in order to use it with anything like celerity, one must be educated in its use from his youth up. The accurate recording of a bird's song in the field is a difficult matter in itself. Why complicate it by a difficult method when we may make one that is reasonably simple? This "splendid system . . . evolved by ages of use" may do very well for human music, but it is clearly not applicable to that of birds.

In the matter of pitch Mr. Moore concludes that the old method is more accurate. What he means is, not that the song as it naturally is can be more accurately recorded, but that, after it has been artificially changed in both pitch and time to fit the method, the pitch of the recorded notes is

more definite. What we desire is a record of the bird's song as it is, not as we think it ought to be. We cannot fit wild bird songs to our standards of music. Then why not fit our method of making records to the bird songs? Mr. Moore would have us believe that a method which cannot record the pitch of a bird's song closer than a half-tone is more accurate than a method that can record it closer than a quarter tone. Absolute accuracy is out of the question, but relative accuracy should be as close as the human ear can make it, and not limited by the graded pitches allowable in human music.

In this matter of pitch and accuracy of record I wish to explain that it is entirely possible to use different colors for the coördinate lines, and the lines representing the song. This obviates the necessity of making the song lines heavier than the others, and thus makes the location of the pitch of each note plainer. I hoped at first to have this done with the figures used to illustrate my article. In work in the field I do this by simply using quadrille paper note-books, in which the lines for both time and pitch are already drawn in light blue. Such a note book has the advantage of being purchasable almost anywhere, either in ordinary or loose-leaf form. With such a note-book it makes little difference whether twelve or thirty-six lines are necessary to record a given song. With two colors I have been able to indicate an accented note, or other notes of greater intensity than the main song by simply making the lines, representing these notes, heavier when recorded in pencil, and broader when recorded in ink.

The factor of pronunciation Mr. Moore considers of little importance because musicians do not recognize it as a part of music. Pronunciation may have nothing to do with music, but it has a great deal to do with bird songs. The liquid *l* is an extremely important factor and its presence or absence is of great assistance in the recognition of a song in the field. But Mr. Moore wishes to have pronunciation classed as a sub-head under quality. What it has to do with quality is hard to see. Too many people already have quality, intensity and pitch, hopelessly confused, so why mix pronunciation with it? Quality depends entirely on the presence or absence of certain overtones, and the relative intensity of these overtones. Quality includes nothing else. Is it scientific to make it include pronunciation?

Mr. Moore tells us that the presence of marks indicating pronunciation blurs the pitch of the note. If the loop used to indicate an *l* sound, starts at a certain definite point and ends at that point, making no progress horizontally or vertically it blurs neither pitch nor time. This is another objection evidently originating in Mr. Moore's imagination.

Too great a musical knowledge in some cases is liable to result in too little along other important lines. It is liable for instance to make one conclude that such a term as "trill" has only one meaning. Looking up "trill" in Webster's dictionary I find that my definition is more correct for the ordinary use of the word than Mr. Moore's. The musical trill, which Mr. Moore considers the only real trill, is referred by Webster to the word "shake." The ordinary trill is defined in the dictionary as a single note, interrupted by the regular recurrence of a consonant sound.

Whether the trills of birds are caused in this way or by rapid repetition of a note is hard to say. There seem to be reasons for thinking that trills are caused in both ways in bird song. But Mr. Moore's shake must be rare in bird music, and is certainly not worth bothering our heads about. Ornithological literature abounds in the use of the word trill, describing these phenomena of bird songs. Yet our critic considers these writers all wrong because this trill is not one in the strict, narrow, musical use of the term. He further concludes that my records are rendered inaccurate for the same reason, although even to Mr. Moore, who supposed all trills were shakes, what I meant by trill was perfectly plain.

Mr. Moore objects to the term "graphic method" because the old system is also graphic. In the broadest sense of the word "graphic" he is right. But "graphic method" has become particularly associated in recent years with methods of recording various facts, mathematical and otherwise, by the use of coördinates. In that sense this title is particularly appropriate.

My aim in introducing the graphic method was to show that more accurate methods than the old system of musical notation could be devised. The old method when applied to bird songs has been almost universally recognized as a failure. A familiar bird song, written on the musical scale, looks unfamiliar, even to the man who understands musical symbols. The result when it is played on the piano with an accompaniment of chords is absolutely ludicrous. Anyone can see that the reason for this is the inaccuracy of the old method, in its attempts to put together a method and a variety of music that were not made for each other. The graphic method does away with these difficulties, as well as the temptation to write chord accompaniments and to play the song on the piano. It records the song simply and naturally, and so graphically that anyone can see its meaning at a glance. It becomes familiar after very little study, and its use in the field is much easier than the intricate system of symbols of the old method. In a word it is far more accurate, far more comprehensive and far more simple.

I do not wish to convey the impression that I believe the graphic method perfect. Seldom if ever is a new idea brought out by one person that cannot be improved by someone else. I would gladly welcome suggestions, criticisms or improvements that are constructive in nature, and not based on misinterpretation, or evident wish to make unqualified condemnation. I believe thoroughly in the principle back of the graphic method, and I am willing to leave its fate to the test of time, having confidence that the old method with its inaccuracies and complications must go, and that in the future either this method or something based on similar ideas will be generally used by students of bird song. I hope in some future time to present more studies of bird song based on the graphic method, and after further field study to go into the subjects of intensity and pronunciation more deeply.

ARETAS A. SAUNDERS.

New Haven, Conn.

Oct. 30, 1915.

[Both Mr. Saunders and Mr. Moore seem agreed that some sort of 'graphic' representation of bird song is preferable to the syllabic method. Choice between their methods is largely a matter of personal opinion and both having been exploited at considerable length it seems hardly desirable to continue the discussion further in these columns. A note by Mr. Summers in General Notes, p. 78, *antea*, as well as Mr. Oldys' paper, p. 17, deal further with this subject. ED.]

On the Position of the *Aramidae* in the System.

EDITOR OF 'THE AUK.'

Dear Sir:—

Your very interesting notice of my two recent osteological papers, which appeared in 'The Auk' for October, 1915 (pp. 517, 518), seems, in one instance at least, to demand a few words from me by way of defence.

Dr. Mitchell's conclusions are only known to me through my having seen the notice of his paper in the 'Abstract of the P. Z. S.' of May 25, 1915, p. 34. There I read that he read, as Secretary of the Society, "a communication on the Anatomy of the Gruiform birds, *Aramus giganteus* Bonap., and *Rhinocetus kagu*, in which he showed that *A. giganteus* resembled *A. scolopaceus* very closely in the details of its muscular and bony anatomy, and that the genus *Aramus*, in these respects, was very close to the true Cranes."

That the two species of *Aramus* are very much alike in their morphology will, of course, not be questioned; but that these birds are "very close to the true Cranes" structurally, is a statement which I contend cannot be sustained, nor does the anatomy of the several forms demonstrate it. In a paper I published as long ago as 1894 (Jour. Anat. and Phys. London, Oct., Vol. 29, n. s., Vol. 9, pt. I, art. 5, pp. 21-34, text figures), I carefully contrasted, in three parallel columns, the essential osteological characters of *Rallus longirostris*, *Aramus vociferus*, and *Grus americanus*; and this comparison demonstrated the fact that *Aramus* had more rail characters in its skeleton than gruine ones. My subsequent publications on the subject practically sustained this opinion. Finally, the paper of mine, which you kindly noticed in 'The Auk,' is entitled "On the Comparative Osteology of the Limpkin (*Aramus vociferus*) and its Place in the System," a contribution to the subject which recently appeared in 'The Anatomical Record' (Vol. 9, No. 8, Aug. 20, 1915, pp. 591-606, figs. 1-14). In this paper I thought I showed very clearly that, osteologically, the *Aramidae* were nearer the *Rallidae* than they were to the *Gruidae*. Other anatomists have arrived at the same conclusion. But to discuss all of these opinions would occupy far more space than necessary in the present connection; so I shall confine myself to what one of the most painstaking and able avian anatomists had to say on the subject. I refer to the splendid work of William Macgillivray, who prepared all the bird dissections of American birds for Audubon's great work on "Birds of America." Macgillivray